Title: Findings from the first phase of developing a receptive vocabulary test for the Irish language.

Abstract:

Aims and Objectives

The aim of this study was to develop and pilot a test of receptive vocabulary for bilingual Irish-English speaking children, based on a model from Welsh (Gathercole, Thomas & Hughes, 2008).

Design/Methodology/Approach,

310 typically developing children aged five, six and seven years took part. The children were all attending Irish-medium education in Irish-dominant *Gaeltacht* regions and in immersion education schools outside of these regions.

Data and Analysis

Participants were identified as being from either Bilingual Irish and English-speaking homes (BHs) or English-Dominant Homes (EDHs). A mixed-factorial ANOVA found a significant main effect of age and language background, but no interaction. Post hoc comparisons revealed that those from BHs had significantly higher Irish receptive vocabulary scores than those from EDHs. Linear regression models showed that the receptive vocabulary scores of children in immersion schools grew by an average of 21 words per year between the ages of five and seven, compared to almost 12 words per year in *Gaeltacht* schools.

Findings/Conclusions

The findings demonstrate the advantages of immersion education and the need for vocabulary enrichment of children in the *Gaeltacht.* However, the complexities of developing assessments for L1 speakers of a minority language that is in conflict with an L2 variety of that language and the majority English language are also highlighted.

Significance/Implications,

The implications of this study are that immersion schooling is advantageous to the Irish vocabulary of children but that children from *Gaeltacht* schools may require vocabulary enrichment that is sufficiently complex to address their needs.

Limitations

Limitations to this study include the uneven number of children from each language background/school location, and incomplete background details from the children such as socio-economic status and language use amongst peers.

Keywords: Irish, receptive vocabulary, immersion education, minority language

Introduction

Status of Irish and Irish-medium education

Irish is officially recognised as the first language of Ireland, although English is the dominant language used in most daily interactions. As there is official state support for the language and as all children are required to learn Irish in education, results from the 2016 census showed that 1.7 million people (almost 40% of the population) were 'able to speak' Irish. The reality is that most people are only using the language in educational settings with just 73,803 people using the language daily outside of education. Of these daily speakers 27.9% live in the *Gaeltacht* areas which are officially designated Irish speaking regions, mostly on the west coast of Ireland. The region with the highest percentage of speakers is Connemara (between 50-70% of the population), followed by Donegal (over 51%) and in west Kerry (*Corca Dhuibhne*) and *Múscraí* where the current study took place, 29% and 23% of the population respectively speak Irish on a daily basis (reduced from 35% and 26% in the 2011 census).

Within the *Gaeltacht*, Irish is now recognised as an endangered heritage language with increasingly restricted domains of use, based on the results of two noteworthy studies. The first was the Comprehensive Linguistic Study of the use of Irish in the *Gaeltacht* (CLS; Ó Giollagáin, Mac Donnacha, Ní Chualáin, Ní Shéaghdha, & O'Brien, 2007) which reported a decrease in children acquiring Irish as a first language in the home, and an increase in English language use among young Irish speakers in social situations. This trend had previously been noted by Hickey (2001) who commented on the increasing numbers of children from English-Dominant Homes (EDHs) in preschool settings in the *Gaeltacht*, resulting in a shift to English in social settings with children from Irish-Dominant Homes (IDHs). This means that children from IDHs become Irish-English bilinguals at a very early age, and certainly by the time they enter school (Hickey, 2001). As a consequence, there are fewer opportunities, domains and contexts for young people to speak Irish, in comparison to previous generations and this has resulted in qualitative differences in the Irish spoken among younger generations (Nic Flannachadh & Hickey, 2017). A follow on study from the CLS was carried out by Péterváry, Ó Curnáin, Ó Giollagáin, and Sheehan (2014) which assessed the language development of 50 children acquiring Irish as a first language in the Cois Fharraige and South Conamara *Gaeltacht* region of Co. Galway. In this study, the children's fluency was measured by asking the children to tell a story from a wordless picture book and then by answering specific questions related to the story. The task was carried out in Irish and

in English using two separate stories and the samples were analysed in terms of language content, structure and use. This study found that the children had good fluency in Irish, but had a higher level of ability and frequency of use of English. Overall they felt that the children had an incomplete acquisition of Irish in comparison to previous generations, meaning that some aspects of language were never acquired, or not fully mastered and therefore weakened or lost (Montrul, 2016).

In Ireland, all children learn Irish as part of the national primary and secondary school curriculum, and it is an obligatory subject for all students to study until they leave school (although exemptions apply in specific contexts). Most of these children come from monolingual English-speaking homes or more recently, may have a home language that is not Irish or English, and rarely, if ever, use Irish outside of the classroom context. However, there are a number of Irish-immersion schools or *Gaelscoileanna* where Irish is the language of instruction, as well as being an obligatory subject. Although the majority of children in these schools come from monolingual English-speaking homes, a minority would come from Bilingual Homes (BHs) or Irish Dominant Homes (IDHs). Children from BHs, have variable levels of input in the minority language, and are most likely to become English-dominant bilinguals over time and children from EDHs are early L2 learners of Irish through their attendance at Irish-immersion schools. Because of this, those from IDHs and BHs can be considered to be *home-generated bilinguals,* or *bilingual first language learners*, while those from EDHs are *school-generated bilinguals or early second language learners* (see De Houwer, 2011). The popularity of *Gaelscoileanna* outside of *Gaeltacht* regions continues to grow. For example, in 2016/17 there were 305 primary immersion schools on the island of Ireland (including 125 in *Gaeltacht* regions) and 72 post-primary school or units within English-speaking schools (22 in *Gaeltacht* regions) educating over 65,000 children (Gaelscoileanna, 2018). Therefore, as Hickey (2009) points out, the educational context is a significant context for the acquisition of Irish as a second language and one which should be studied.

Previous research on the effects of Irish immersion education has found that it is beneficial to the Irish language development of children from English-dominant homes, and higher test scores have been noted on both Irish and English fluency and reading as well as mathematics when compared to children from English-medium schools (Gilleece, Shiel, Clerkin, & Millar, 2012). However, Irish immersion education has not been found to be as

advantageous to the Irish language development of children from Irish-dominant homes (Hickey, 2001), partly because the needs of developing Irish in the L2 learners (often in the majority) are prioritised over maintaining and enriching the language of the L1 learners. This results in a reduction of the linguistic complexity of the Irish being used in the classroom and an increase in the use of English among peers, meaning that it is English rather than Irish that tends to show the greatest improvements over these years. Furthermore, others have pointed to a reduction in the amount and complexity of Irish language input in the home and a lack of opportunities in literacy activities being linked to lower outcomes in the Irish language for those from L1 homes (Harris, Forde, Nic Fhearaile, & O'Gorman, 2006).

Bilingualism and the Irish language

For some, the question as to whether all Irish-speaking children, including those in *Gaelscoileanna* should be considered 'bilingual' is complex. However, the idea that a bilingual child is equally balanced in speaking, understanding, reading and writing in both or all of their languages is a myth. Baker (2011) highlights that a bilingual's use of their languages will change over time, context and depending on whom they are interacting with. This will result in strengths and weaknesses depending on the domain under examination. Therefore, bilingualism should be considered more of a spectrum or continuum of abilities (Grosjean, 2008). This broad definition of bilingualism has been incorporated into best practice guidelines for speech and language therapists, which state that a person should be considered to be 'bilingual' if they acquire and use communication skills in more than one language and that 'an individual should be regarded as bilingual regardless of the relative proficiency of languages understood or used' (Royal College of Speech and Language Therapists [RCSLT] 2006; 268). This also means that assessment and intervention must consider all of the languages to which the child is exposed.

The majority of children attending Irish-immersion education are either from bilingual or English-dominant homes, and so assessment of their language skills in English is always possible. However, this practice could underestimate their abilities, as many items, particularly vocabulary items acquired in the school context, are not considered. We already know from monolingual language acquisition that children's vocabulary knowledge will depend on the quality, complexity and frequency with which they are hearing words (Hart & Risley, 1995; Huttenlocher, 1991). This issue is compounded in bilingual language acquisition, as their everyday exposure to words will be distributed across the various

contexts in which they are exposed to their languages. This means that they often learn words associated with one language (such as vocabulary for items at school vs. those at home) that they do not express in the other (Peña, Bedore & Kester, 2016). Gathercole, Thomas & Hughes (2008) and Smithson**,** Paradis and Nicoladis (2014) highlight the effect of the language of schooling on vocabulary knowledge in bilinguals, although point out that the language used at home will have a larger effect, particularly for minority languages. For example, a study by Gathercole and Thomas (2009) found that by age 7, children in Wales had similar receptive vocabulary scores in English regardless of their home language background, but that their scores in their minority Welsh language strongly related to how much Welsh was spoken at home. In their research with Spanish-English bilinguals in the US, where one parent spoke Spanish and the other English, Hoff, Rumiche, Burridge, Ribot and Welsh (2014) found that home language use of English strongly predicted vocabulary scores in English, but did not predict vocabulary scores in Spanish. Although other studies have found continued differences between bilinguals in the attainment of the majority language beyond age 7 (see Thomas, Gathercole and Huges (2014) for a discussion), in general it is the minority language that is more at risk for incomplete acquisition. Smithson et al., (2014) maintain therefore that minority language input in the home has a more important influence on vocabulary development in that language than input in the majority language due to the limited sources to hear and use the minority language outside of the home.

Assessment of Vocabulary

Professionals such as psychologists and speech and language therapists who work with the Irish-speaking bilingual population have highlighted their need for language tests in Irish in order to measure the full potential of children referred to their services (O'Toole & Hickey, 2013). As many of these professionals 'are able to speak' Irish, many do attempt to assess the child in both Irish and English. However as there are no normed tests available, and as educational services demand psychometric testing with standardised score results in order to access services, some professionals resort to translating English language tests to Irish and converting the raw score obtained to a standard score based on the English standardisation results (O'Toole & Hickey, 2013). This is problematic for a number of reasons. Firstly, words represented on an English vocabulary test reflect the frequency that these words appear in English and the age that monolingual English-speaking children acquire them. If the translation equivalents are of a different frequency or familiarity in the other language, it is possible that children may not know all words with the same familiarity or may know more

of them depending on the language (Peña et al., 2016). Furthermore, translations may result in the use of cognates or loan words from English, and it is important that a language test should not allow a child to use their knowledge from their other language as it may mask their difficulties in that language (Gathercole et al., 2008). Translating a test to Irish, which has different frequency, familiarity and age of acquisition for vocabulary distorts the assessment of a child's ability, and could result in an over or underestimation of their abilities.

Vocabulary assessments with some normative information in Irish exist for very young children (aged 16-36 months; O'Toole & Hickey, 2017), but for older children, there is only a test of reading vocabulary (Gilleece, et al., 2012) with norms for children attending Irish-medium education in *Gaeltacht* and Irish-immersion schools. Other stuides have attempted to devise language assessments for Irish, including one for receptive vocabulary, however these are largely based on translations from the English language versions (Parsons & Lyddy, 2009; McVeigh, Wylie and Mulhern, (2017). Furthermore, few if any of these studies considered the home or school language background of these children. As Gathercole et al., (2008) point out, a measure of a child's linguistic knowledge should consider not only where the child performs in relation to the whole population, but also in relation to bilingual children with similar levels of exposure so that there is not a single normative measure for all bilinguals. For Irish-speaking children, a test should indicate at least their exposure to Irish and English in the home and school settings.

The current study aimed to consider these factors in developing a receptive vocabulary test for Irish. We chose receptive vocabulary, not only as it is frequently used in tests of IQ and reading as an indicator of cognitive and academic achievement (Smithson, et al., 2014), but as it has been found to be an indicator of overall linguistic competence in the Irish context (Péterváry et al., 2014). This means that it will give an indication of achievement or potential in other areas of language such as morphosyntax. The importance of assessing vocabulary is reinforced from the observation that sequential bilingual children can have a greater deficit in vocabulary than grammar, as vocabulary must be learned on an item by item basis when compared to grammatical rules which are often generalizable (Oller, Pearson & Cobo-Lewis et al., 2007, Paradis & Genesee, 1996). Vocabulary testing can therefore be used as an initial screening of a child's linguistic ability, and where difficulties emerge, point to the need for further assessment (Gathercole et al., 2008).

Irish language speakers have statutory rights to access publically funded services in Irish, including psychology and speech and language therapy and so developing an Irish language test provides for the needs of these professionals and families (O'Toole & Fletcher, 2010). In addition, if best practice guidelines are to be followed for children attending immersion education, assessment needs to take place in both English and Irish, regardless of their home language background (RCSLT, 2006). All children attending immersion education setting should therefore be considered bilingual, ranging from L1 Irish speakers from Irish-dominant homes at one end of the continuum, to two-L1 Irish-English bilinguals from bilingual homes and L2 Irish speakers from English-dominant homes at the other end. The aims of this research were therefore to devise and pilot an assessment of receptive vocabulary in Irish for five- to seven-year olds using the model outlined for Welsh as described by Gathercole et al. (2008). We wanted to see how typically developing children would perform on the test, with a view to revising and standardising the test following analysis of the results so that it could be used as a basis for developing an assessment tool for identifying children with language disorder in the future.

Our research questions were as follows:

1. Do children from BHs perform better than those from EDHs on a test of Irish receptive vocabulary at age five, six and seven?
2. Do children from *Gaeltacht* immersion schools perform better than those from immersion schools outside of the *Gaeltacht* on Irish receptive vocabulary?

Method

Materials

Receptive Vocabulary Test

The lexical items selected for the vocabulary test were based on the criteria outlined by Gathercole et al. (2008) as follows:

1) All words were native Irish words and not borrowings from English
2) There were no Irish-English cognates, even if they were not borrowings
3) Dialect specific words were avoided whenever possible
4) The words covered a range of frequencies and complexity, so that the test could discriminate usage across the age range of five- to seven- years and range of linguistic abilities (see below)
5) The words could be represented in a static picture

Similar to the Gathercole et al. (2008) study, both corpus and frequency data were consulted to select the target vocabulary items. For example, corpus data for Irish from the CHILDES database were consulted (Guilfoyle, 1992) as well as any other available paper on the acquisition of Irish (Hickey 1992; Owens, 1992). Then frequency and age of acquisition data from a study of vocabulary acquisition of 840 words for children aged 16-40 months using the CDI adaptation to Irish (O'Toole & Fletcher 2010) was consulted. This helped to identify and eliminate words that were acquired very early (as they could produce a floor effect) and to identify later acquired words for inclusion as early items in the current test. The frequency data were also useful for identifying high and low frequency vocabulary items for consideration. In addition, the National Corpus of Irish Word Frequency by the Institiúid Teangeolaíochta na hÉireann, (1999), a word frequency list by Scannell (2004) and a corpus-based frequency list of Irish lemmas based on the New Corpus for Ireland (Měchura, 2015) were consulted. Furthermore, words from the Irish Curriculum for *Gaelscoileanna* were chosen based on those considered appropriate for five to seven year olds. The selected words covered nouns, verbs, adjectives prepositions, quantifiers as well as social words. Finally, six native Irish speaking adults the *Corca Dhuibhne Gaeltacht* who spoke Irish daily were asked about the suitability of the low and high frequency words in order to enhance the validity of the word list. These adults were bilingual Irish –English speakers and three were primary

school teachers in the 30s and 40s (one man, two women), and three were mothers in their 30s who were at home with their school-age children.

Following this initial adaptation, words which five year olds were expected to know were placed at the beginning of the assessment and as the assessment progressed, proportionately lower frequency words were used. Taking all these resources into account, 150 words were chosen that met the criteria listed above. Pictures were sourced from various internet sites, or hand drawn by an artist where necessary. The test was piloted with two children from English speaking homes, who attended an Irish-immersion school. The same adults (three parents and three teachers) as previously mentioned were consulted about the appropriateness of the pictures chosen as representations for the target words. The outcomes resulted in several adaptations being made to the assessment before it was used in the recruited schools. These adaptations were mostly changes in the target pictures used and in the distractor items. For each of these words, a set of four pictorial stimuli were arranged in a 2 x 2 table on a Microsoft Word document which gave the participants a 25% chance to guess the answer. One picture was a 'match' for the word, and the other three pictures were distracters. The distracters included a semantic distracter, a phonemic distracter and an unrelated distracter which is similar to the structure of the British Picture Vocabulary Scales (BPVS; Dunn, Dunn, Whetton & Burley, 1997). For example, for the target word *bó* /bo:/ 'cow', the distracters included *caora* /kʷiɾə/ 'sheep'; (*níos) mó* /mo:/ 'more' and peann /pʲaʊn/ 'pen'.

Language Background Questionnaire

A language background questionnaire obtained information about the parents' native languages, which languages were spoken in the home by parents and children and the proportion of time that each language was spoken as well as which languages the child was exposed to outside of the home. The intension was then to assign each child to a home language group using the criteria outlined by Gathercole et al., (2008). For example, Irish-Dominant Homes (IDHs) were those where both parents (or a single parent in single-parent households) spoke only/mostly Irish to the child and English-Dominant Homes (EDHs) were those where parents spoke only/mostly English to the child. Bilingual homes (BHs) were those where both parents spoke both Irish and English to the child; where one parent spoke only/mostly Irish, and the other parent spoke only/mostly English to the child or where one parent spoke mostly Irish and the other parent spoke both Irish and English to the child.

Participants

Participants were recruited from Irish-medium primary schools in *Gaeltacht* regions and Irish-immersion schools in the Munster region of Ireland. In total, six primary schools from the *Gaeltacht* regions of *Corca Dhuibhne* and four from *Múscraí* took part, and six immersion *Gaelscoileanna* across Cork and Limerick city and county took part. At the time of recruitment, there was no Irish language policy for Gaeltacht schools, and each school would have used varying levels of Irish and English input in their schools. Children who presented with intellectual disabilities, language impairments, hearing impairments or were exposed to another language apart from Irish and English at home were excluded from this research. In total, there were 310 participants aged five, six and seven years from Irish-Dominant Homes (IDHs), Bilingual Irish and English Homes (BHs) and English-Dominant Homes (EDHs). As only a total of 18 participants categorised themselves as coming from IDHs, (all based in the *Gaeltacht*), we combined their results with those from BHs in the Gaeltacht.

Procedure

All children were tested individually in their school. The assessment began with two practice items to make sure the children understood the procedure. Then the researcher asked the children to point to the picture that went best with the word they heard. All instructions and interactions were in Irish. There was no baseline rule, but a ceiling of five consecutive incorrect answers after which the test was discontinued was applied. A raw score was obtained at the end of each test and the researcher noted the number and type of distracters chosen by the participants. Participants completed the assessment in a minimum of ten minutes and a maximum of twenty minutes. Parents were provided with a brief summary report of each child's performance after completion of the assessment.

Results

Age and home language background

Raw scores for children from BHs and EDHs are in Table 1.

Table 1. Mean raw scores in BHs and EDHs by age

	Bilingual Home			***English Dominant Home***			***Total by Age***		
	n	**Mean**	**SD**	*n*	**Mean**	**SD**	*n*	**Mean**	**SD**
5-year-olds	*57*	103	27.7	*26*	87	34.2	*83*	98	30.6
6-year-olds	*62*	115.6	24	*62*	110	25.6	*124*	112.8	24.9
7-year-olds	*51*	128.1	18.1	*52*	126.5	18.3	*103*	127.3	18.1
Total by Home Language Background	*170*	115.1	25.7	*140*	111.8	28.6	*310*	113.6	27

We first conducted a mixed-factorial analyses of variance in which age (five, six & seven) and home language background (BHs vs. EDHs) were entered as variables for the dependent variable of raw receptive vocabulary scores. We found a significant main effect of age ($F(2,304)= 37.17$, p= 0.000 η^2=.19) and home language background ($F(1, 304) = 7.17$, p=0.008, η^2= 0.02), but no interaction. The effect size for both findings was small, particularly for home language background. Post hoc testing with Bonferroni corrections noted that seven-year olds performed significantly higher than six- (p= 0.000) and five-year olds (p= 0.000) and six-year olds performed significantly higher than five year olds (p= 0.000). In addition, children from BHs performed significantly higher (p=0.008) than those from EDHs. These performances are plotted in Figure 1.

INSERT FIGURE 1 HERE

As can be seen, although none of the children reached ceiling on the test (150 items), some seven-year olds achieved very high scores. Five-year olds from BHs appeared to have higher vocabulary scores than those from EDHs, but this could be due to reduced number of five-year olds from EDHs. However, there does appear to be a sharper growth in receptive vocabulary scores for 6-year olds from EDHs, so that by seven years their scores are

converging with those from BHs. As we found no interaction between age and home language, these differences are not significant.

Age, home language background and school location

We further divided the children by school location into those that were based in schools in *Gaeltacht*, and those in immersion education outside of the *Gaeltacht*, taking into account their age and home language background measures (see Table 2). A total of 176 children (57% of the group) came from *Gaeltacht* schools, and 134 children (43%) came from immersion schools.

Table 2. Mean raw scores in BHs and EDHs in *Gaeltacht* and Immersion schools

	BH Gaeltacht			***BH Immersion***			***EDH Gaeltacht***			***EDH Immersion***		
	n	**Mean**	**SD**	*n*	**Mean**	**SD**	*n*	**Mean**	**SD**	*n*	**Mean**	**SD**
5-year-olds	*43*	105.3	22.9	*14*	95.9	39.3	*9*	94.2	30.4	*17*	83.2	36.3
6-year-olds	*47*	114.12	25	*15*	120.1	20.6	*16*	92.6	30.1	*46*	116	21
7-year-olds	*37*	125.7	19.7	*14*	134.6	11	*24*	122.9	18.8	*28*	128.5	17.6
Total by Location	*127*	114.5	24.1	*43*	116.9	30.2	*49*	107.7	28.9	*91*	114	28.4

As can be seen, when we divided the participants in this way, there were reduced numbers in each group, particularly for those from BHs in immersion education and from EDHs in the *Gaeltacht*. Because of the reduced numbers, we carried out a series of linear regression models using age as a co-variate in order to help interpret the data. Our first models included a three-way interaction between school location (*Gaeltacht* vs. Gaelscoil), language background (BHs and EDHs) and age, but was not significant (p=0.579). Similarly, a two-way interaction between school location and language background was also not significant (p=0.297). Therefore, these interactions were dropped from the model, leaving a school-location and age interaction (p=0.01) and the main effects of language background, school location and age. Adjusted R-squared value for this model was 0.205, meaning that 20% of the variance in the data was explained by the model. The outcomes from the model were as follows:

a) **Age**: for every one-year increase in age (from 5 to 7) there was an average increase in the receptive vocabulary score of 11.7 (95%CI: 7.2, 16.2) in *Gaeltacht* schools and an increase of 21.1 (95%CI: 15.5, 26.7) in immersion schools [obtained from the linear combination of parameter estimates]
b) **School location**: Regardless of language background, 5-year olds in *Gaeltacht* schools had receptive vocabulary scores on average 4.9 points higher (95%CI: 1.8, 30.4) than the same age children in immersion schools. No difference was noted in the scores between the 6 and 7-year olds.
c) **Language Background**: Regardless of a child's age or school location, those from BHs had vocabulary scores on average 8.5 points higher (95%CI: 2.5, 14.4) compared to those from EDHs

The predicted values from the model are plotted in Figure 2.

INSERT FIGURE 2 HERE

The linear predicted slopes in Figure 2 show us that children in immersion schools had a steeper growth for receptive vocabulary than those in *Gaeltacht* schools.

Discussion

The results demonstrated that overall, the receptive vocabulary scores on this prototype test of Irish receptive vocabulary showed a developmental progression between five, six and seven-year olds. This is encouraging, and shows us that this tool could be used as a developmental test of receptive vocabulary up to age seven. We also found a small, but significant effect of input in the home language, in that those from BHs overall performed better than those from EDHs. This is largely in line with the Welsh study, in that children from Welsh-dominant homes performed better than those from BHs or EDHs on receptive vocabulary, and likewise those from BHs performed better than those from EDHs. Unfortunately, our sample had very few participants from Irish-dominant homes, and so it was not possible to determine if these children performed better than those from BHs or EDHs. The study would have been strengthened by having a group of children acquiring Irish as their L1, as the quality and quantity of language input would be arguably higher and less

variable when compared to those from BHs. In this way we could confirm whether the test is sufficiently complex to capture vocabulary development in L1 speakers. That we couldn't identify a sufficient number of these children may be reflective of the decline of Irish as a home language in *Gaeltacht* regions of Munster as indicated in the 2016 Census results. Anecdotally, there was a reluctance among parents to say that they 'only' or 'mostly' used Irish at home in their questionnaires, even if both parents could speak the language, as they acknowledged the infiltration of English in most interactions. This resulted in most children in these *Gaeltacht* regions as being categorised as being from BHs. Similar studies looking at Irish language performance in children from various home language backgrounds in the stronger *Gaeltacht* regions around Galway have not had similar issues in recruiting families from IDHs (Nic Fhlannachadh & Hickey, 2017; Muckley, 2015).

When we categorised our group based on home language background and school location, our regression analysis showed confirmed that those in BHs had higher receptive vocabulary scores. In addition, children in *Gaeltacht* schools had higher receptive vocabulary scores, but only at age 5. We also found that the growth in receptive vocabulary scores was higher (21.1 per year vs. 11.7 per year) in immersion schools compared to *Gaeltacht* schools. One reason for this outcome could be that the items on the test were not of sufficient complexity to demonstrate the range of ability for children from *Gaeltacht* schools, or that they were biased towards L2 varieties of Irish, meaning that those in immersion schools outside of the *Gaeltacht* were unfairly advantaged. We may also expect a sharper growth in Irish vocabulary scores of children in immersion schools as they were starting from a lower base than those in Gaeltacht schools. However, previous research has also found that the supposed advantage of having mostly Irish in the home or in the *Gaeltacht* community did not result in greater Irish receptive vocabulary scores for these children when compared to those in immersion schools. For example, Parsons and Lyddy (2016) noted an initial advantage in Irish receptive vocabulary scores for those in *Gaeltacht* schools, but by the 3rd year of schooling (approximately 8 years of age), children from immersion education outside of the *Gaeltacht* were performing on par with their peers in the *Gaeltacht*. Furthermore, Harris et al. (2006) found that some children in the immersion schools outperformed their peers in *Gaeltacht* schools on tests of Irish language attainment, particularly in literacy. This was partly attributed to the changes in home language-transmission of Irish with increasing numbers children from EDHs attending *Gaeltacht* schools, and consequently a reduction in the amount of Irish medium instruction (Nic Fhlannachadh & Hickey 2017). This finding has

been reflected in studies of older children in the *Gaeltacht* (Ó Giollagáin, et al., 2007; Mac Donnacha, Ní Chualáin, Ní Shéaghdha, & Ní Mhainín, 2004; Péterváry, et al., 2014; Lenoach, 2014).

The strong performance of children immersion schools is comparable to studies of receptive vocabulary attainment from other immersion education settings which have found that children can score at similar levels to native speakers (Harley, Allen, Cummins & Swain, 1990). One reason for this outcome could be that children from EDHs have a strong foundation in their first language, before they start learning a second language at the age of four or five and continue to have rich exposure to English outside of education. This is not the case for the children from IDHs or BHs where restricted domains of use of Irish, and an attenuated level of input at school and home result in Irish language attrition and at the same time, progression in English. Previous cross linguistic research has shown that successful bilingual acquisition is highly dependent on language input and experience. For example, in a community where both languages are spoken and supported, such as French and English in Montreal, Elin Thordardottir (2011) found that children with equal levels of exposure had similar receptive vocabulary scores in both languages, and that their performance was similar to monolinguals. This finding has not been replicated in other bilingual context where one language is in the minority, such as Spanish-English bilinguals in the US (Hoff et al., 2014) or Welsh-English in Wales (Gathercole & Thomas, 2009, Thomas et al., 2014) and could be argued to be due to the sociocultural context in Canada where both languages have a majority status, are supported and are fairly closely related (Smithson, et al., 2014). The role of exposure is important for all bilinguals, but is exacerbated in a minority language situation such as Irish, as children are dependent on the input in the home that may not be supported by the community (Pearson, 2007, Elin Thordardottir, 2011). It seems to take greater level of home-language input in a minority language for children to progress in that language than the majority language which is learned more easily (Ribot, Hoff, & Burridge, 2017).

However, to say that proficient bilingual language acquisition relies solely on the amount of exposure in the home is to simplify a very complex process. Unsworth (2014) outlines a number of factors that will ultimately determine a bilingual child's proficiency in their languages which are different to that of monolinguals. She states that although home language use of the minority language is important, it does not guarantee continued development or ultimate attainment, particularly once they start school. As she states; "all

input is not equal" (p.11). She goes on to describe other familial, societal and educational factors that come into play. These include language use among siblings and peers. Thomas and Roberts (2011) also recommend determining language use among peers when categorising children in language backgrounds, as they have found it to be predictive of linguistic knowledge in Welsh. Had we included this in our current study, we might have been able to get a better estimate of true language use for these children than input in the home does not capture. Another factor outlined by Unsworth (2014) is how much exposure is received from non-native speakers. As Irish is more frequently acquired and spoken as an L2, both L1 and L2 speakers will often be exposed to a non-native variety of the language, especially at school. In our study, we had a large number of schools, with no measurement of actual use of Irish in these contexts, or how much exposure children had to non-native speaking teachers. One way to measure this would be to categorise Irish-immersion schools based on the amount of Irish language instruction as is carried out in Welsh-medium schools (Thomas et al., 2014), and to include information on teacher proficiency. This might help in understanding the true level and quality of Irish language instruction and exposure when interpreting outcomes for children.

Another factor linked to the relatively reduced vocabulary scores of children from *Gaeltacht* schools could be linked to societal factors. For example, Harris et al. (2006) noted that children from immersion schools had a higher Socio Economic Status (SES), than those from *Gaeltacht* schools. The influence of SES on language ability has been well documented for both monolinguals (Hart & Risley, 1995) and bilinguals (Smithson et al., 2014, Unsworth, 2014) and may have played a role in the outcome of the current study, although it was a limitation that we did not collect it as part of the study. Another factor that was relevant in Harris et al. (2006) was a less favourable attitude from the parents in *Gaeltacht* schools towards Irish than those in immersion schools. It might be that parents who send their children to immersion schools outside of the *Gaeltacht* are actively choosing this educational setting for their children when alternative English language schools are available because they are interested in the language and understand the benefits of a bilingual education. On the other hand, *Gaeltacht* parents have no option but to send their children to Irish-immersion schools, and may not have an interest or ability to support their children's Irish language in the home.

On the other hand, it must be noted that the language targets used in previous studies of the Irish language could be skewed towards and "L2 variety" of Irish that is learned in school. There are very few studies of Irish language development as an L1 meaning that we have limited knowledge of the target variety acquired by L1 speakers. It must always be acknowledged that there is a possibility that tests may not be capturing the linguistic achievements of L1 speakers. Harris et al. (2006) did find that by sixth class (approximately 12-years of age), that those in *Gaeltacht* schools outperformed those in immersion schools on measures of linguistic attainment in Irish, and attributed it to improvements in motivation for the children from English-speaking homes to acquire native-like competence due to interactions with peers from Irish-speaking homes and with the wider community. Testing older children and/or a longitudinal study would enable us to plot the Irish language development of children from EDH in the *Gaeltacht* over time. Finally, Bohman, Bedore Peña, Mendes-Perez and Gillam (2010), Hoff (2018) and Ribot et al., (2017) point to the importance of measuring language use or expressive language as a predictor of bilingual proficiency. For example, children from EDHs in French immersion schools scored equivalent to those from French-Dominant Homes on listening and reading comprehension tests in one study, but in practice spoke very little French, and so scored below those from FDHs in tasks of speaking and writing (Swain & Lapkin, 1995). This is because of the additional processing demands that are required to speak a language that is not present when only listening to it. Developing tests for Irish-speakers could therefore be further improved by considering expressive language tasks. Had we tested the children on expressive tasks, we might have seen and advantage of children from Gealtach schools who should have more opportunities to use the language outside of school.

Conclusions and Recommendations

This study provides a foundation for developing a receptive vocabulary test for Irish speakers. Future research should aim to improve the test by including more target items, particularly later acquired and less frequent words which could capture a wider range of language abilities for children in the *Gaeltacht* and be used to assess older children. Ideally, more information from longitudinal observational studies of typically developing children acquiring Irish as an L1 in the *Gaeltacht* should be used to select further vocabulary targets that match the linguistic experiences of these children. This would involve looking at all variants of the language, such as academic vs. informal language as well as the amount of codeswitching and borrowing used if the measure is to be a true reflection of their language

knowledge. It is also imperative that any future research collects data from children in the stronger *Gaeltacht* areas of Galway and Donegal where there is less pressure from the English language and to include more children from Irish Dominant Homes. SES should also be gathered through questions such as parental education and occupation, to help determine if this factor affects vocabulary scores. In addition, the children's English language development on a similar tool must be assessed using an instrument such as the British Picture Vocabulary Scale (Dunn et al., 1997), so that performance on both languages can be determined.

A major challenge in developing any type of normative test for a minority language such as Irish is the fact that the children are acquiring a language that is constantly changing, with high levels of codeswitching, incomplete levels of acquisition and language attrition in the input due to the influence of the majority language (Péterváry et al., 2014; Muckley, 2015). This means that the so called 'norm' or target language for children of a particular age is hard to quantify and qualify, and the distinction between language change and language disorder is unclear. Combined with the dearth of L1 speakers, and the difficulty in measuring a child's true experience with a language, it is unlikely that it will ever be possible to develop a truly 'normative' or standardised test. One way to overcome this is to develop assessment tools for Irish such as in the current study to use alongside existing English-language tools, and to use these dynamically. Dynamic assessment, akin to the response to intervention model that has been used in education for decades, is now recommended for diagnosing and assessing bilingual children (Gutierrez-Clellen, & Peña, 2001). Children who quickly learn the linguistic targets are said to have learning potential, and may only require more structured and systematic exposure to the language, whereas those who struggle are thought to have a true language-learning disorder. In this way it helps to distinguish between lack of exposure or experience with a linguistic item and language disorder. Training clinicians, and in particular bilingual professionals such as speech and language therapists, psychologists and teachers who are involved in assessment to use these methods would then improve our diagnostic accuracy and appropriate service provision.

This study points to complexities of developing a minority language within an endangered context. Nic Fhlannachadh and Hickey (2017) recommend that the *Gaeltacht* and Irish speaking communities need to understand bilingualism from a minority language context and how to consolidate acquisition where there are restricted domains of use. For

example, while many studies point to codeswitching as a skill to be valued in bilinguals, Péterváry et al., (2014) considered it to be a sign of language attrition in the Irish language context, as Irish words are placed with English words. They go as far as recommending that parents avoid codeswitching and operate in a 'monolingual Irish mode' as much as possible. This is similar to findings from other minority languages such as Welsh which suggests that the optimal learning environment is where parents only expose children to Welsh in the home (Gathercole & Thomas 2009). Findings from the current study suggest that children from BHs in the *Gaeltacht* may not be developing Irish vocabulary at a rate that we would expect and highlights the need for the language of instruction and curriculum to be at a higher level for these children and those from IDHs. Ní Sheaghdha (2010) and Hickey (2001) recommend that children in *Gaeltacht* schools should be grouped for smaller activities with children from similar home language backgrounds so that they can experience a more linguistically complex environment. In addition, a new curriculum for *Gaeltacht* schools is being introduced following a recent policy document from the Department of Education and Skills (2016), which provides for language enrichment and targeted intervention speakers of Irish in the home. One important area that will need to be addressed, is the promotion home literacy activities and interactive reading in the Irish, due to its links in building vocabulary in monitory language bilinguals (Duursma, Romero-Contreras, Szuber, Proctor, & Snow, 2007). Families and teachers need to be supported in how to promote the minority language, in the knowledge that the majority language is not at risk. O'Toole and Hickey (2013) suggest that this support for language development should be akin to that received by disadvantaged communities in how to create language rich environments for L1 Irish speakers.

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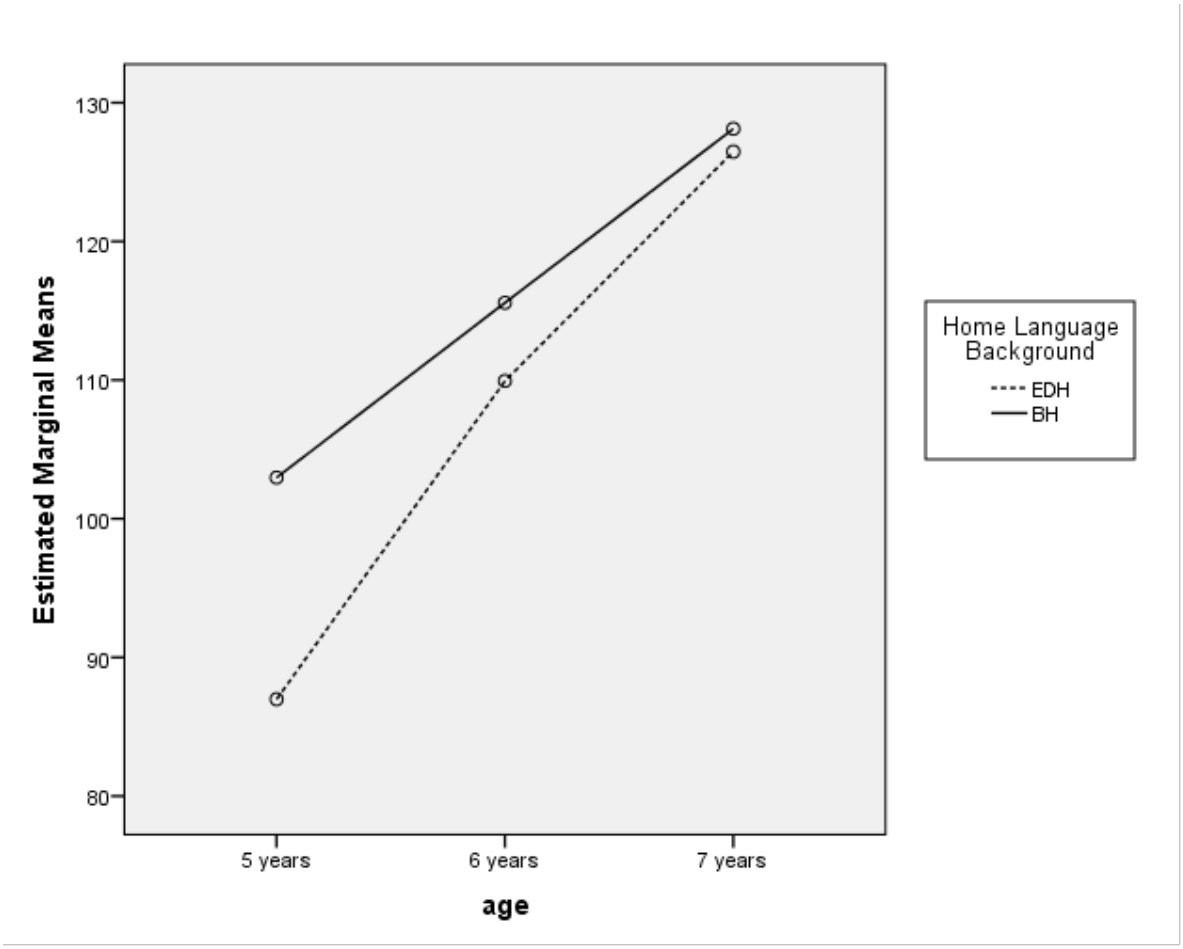

Figure 1: Mean raw scores as a function of age and home language background

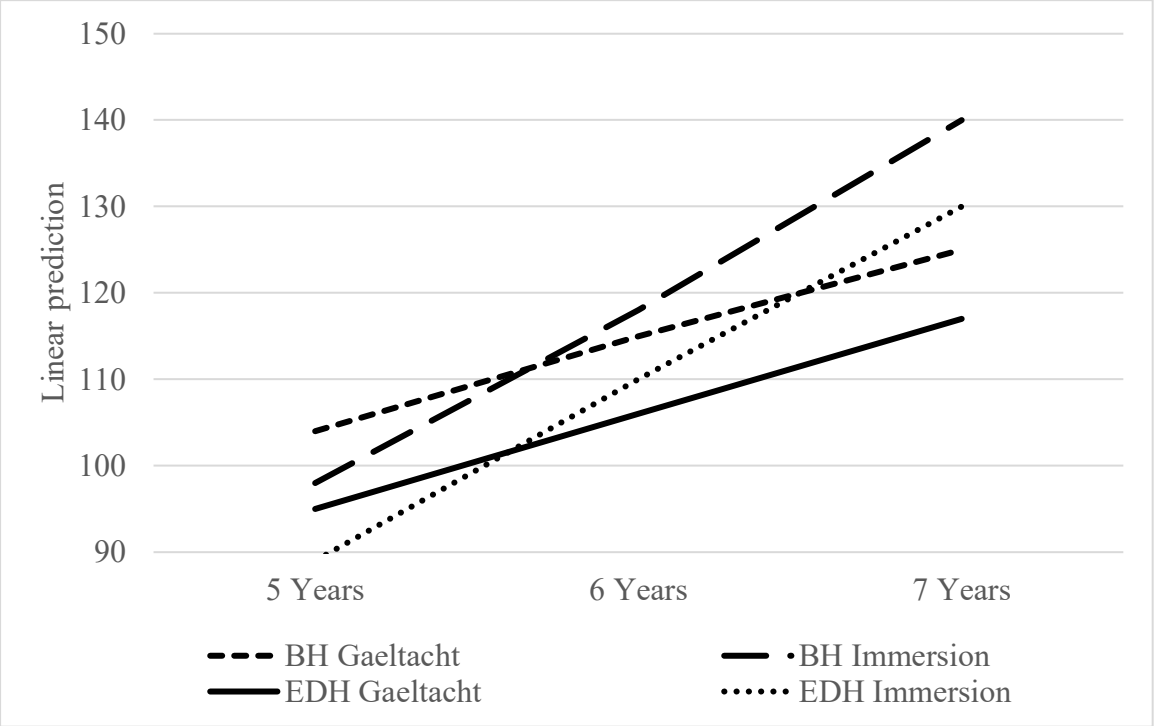

Figure 2: Linear prediction slopes as a function of age, home language background and school location